

REMARKS

Claims 1, 3, 5-8, 10-13, 17, 19, 21-24, and 26-29 remain in the application. Claims 2, 4, 9, 14-16, 18, 20, 25, and 30-32 are withdrawn from consideration.

The specification is amended at paragraphs 0001-0004 and 0008 to update the status of cited applications. Paragraph 0003 is amended to delete material that is duplicative of material that is recited in paragraph 0002. Paragraph 0004 is amended to correct a typographical error in a serial number.

In a previous Office Action, dated June 30, 2005, the Examiner required certain information under 37 CFR 1.105 to assist him in the examination of the application. Applicants supplied such information to the Examiner in their response dated July 28, 2005. However, the Examiner has considered that the response was non-responsive, which is the basis for the present Office Action.

The Examiner states that

“Applicant claims to have no knowledge of relevant products and publications beyond the IDS of non-patent literature filed 07 July 2003 and the two copending applications 10/465,409 and 10/465,378. However, examiner has found several patents with common inventors presently held by Applicant that are certainly considered relevant, and some of said patents cite products, e.g., 6,947,205 B2, 6,556,470 B1, 6,731,532 B2, 6,876,570 B2.”

Applicants note for the record that all of the Examiner’s request for information was directed specifically to “the claimed subject matter art of three-dimensional molecular assembly and its applications for molecular display and moletronics” (Requirement for Information, page 6, items 1-9). Accordingly, Applicants’ response was limited to the information requested. Since Applicants believe they are the first to invent the claimed three-dimensional molecular assembly, they cited what they believed to be the most relevant art.

The Examiner, in citing the four patent above, appears to be interested in the state of the art, since the four patents cited have nothing to do with three-dimensional molecu-

lar assembly, but are possibly of interest in learning the background of this technology. The four references are discussed in greater detail below.

In light of the foregoing, Applicants have expanded their response to include all prior patent disclosures including at least one of the named inventors that have been filed as patent applications. The response below tracks the item numbers listed in the prior Office Action of June 30, 2005.

1. To extend the domain of search for prior art related to the claimed subject matter art of three-dimensional molecular assembly and its applications for molecular display and moletronics.

Applicants' originally submitted an Information Disclosure Statement citing eight (8) references with the filing of the instant application. The Examiner has uncovered a number of references that he considers relevant:

6,947,205 B2      6,556,470 B1      6,731,532 B2      6,876,570 B2

Applicants can possibly be excused from citing 6,947,205, which issued September 20, 2005 (recall that Applicants' previous response was filed July 28, 2005).

6,556,470 is directed to a molecular system switchable between at least two optically distinguishable states, with the molecules exhibiting local electric field induced band gap changes via a molecular conformation change or an isomerization.

6,731,532, which is a division of 6,556,470, is directed to an erasable writing medium comprising a substrate and at least one layer of a molecular colorant coating affixed to the substrate, wherein molecules of the coating are at least bichromal and selectively switchable between color states under influence of a localized electric field.

6,876,570, which is a division of 6,556,470, is directed to a method of fabricating rewritable media, comprising providing a substrate and forming on the substrate a rewritable layer that is writable-erasable and formed by a molecular system, the molecular system including electrochromic switchable molecules, each of the molecules being selectively switchable between at least two optically distinguishable states.

Applicants still do not consider that these references are pertinent to their disclosure, on the basis that the switching entities in each instance are individual molecules.

However, since the Examiner considers these pertinent, then the following references are cited for the convenience of the Examiner, all directed to individual molecules:

Issued Patents:

6,822,893	6,853,577	6,809,956	6,674,932
6,701,035	6,763,158	6,888,978	6,920,260
6,805,817	6,937,357	6,850,230	6,940,497
6,806,453	6,670,981	6,815,706	6,763,158
6,867,427	6,751,365	6,853,478	6,795,230
6,942,312	6,512,119	6,624,002	5,866,284
6,045,955	6,663,797	6,757,457	6,778,165
6,934,424			

Published Applications:

2003-0071780	2004-0095309	2002-0176276	2004-0080804
2003-0194630	2004-0122233	2004-0084661	2005-0006640
2005-0194526	2005-0040417	2004-0041799	2005-0084204
2005-0052983			

Pending (Non-Published) Applications:

10/465,409	10/896,182	10/282,818	10/848,772
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Applicants note that there are many more patents assigned to Hewlett-Packard that do not list them as co-inventors, but are directed to various aspects of moletronics, both electronic, such as crossbar switches and logic devices, and optical, such as displays and electronic inks. Applicants consider such references to be even further removed from their invention than the references cited above. Nevertheless, if the Examiner requires a citation of all moletronics-related patents and published patent applications based on patent disclosures that pre-date the patent disclosure upon which the present application is based, Applicants would be pleased to comply with such requirement.

moletronics and identify the properties of similar products and services found in the prior art.

Applicants previously stated that no products and services are currently available from the assignee of the present application. That statement remains accurate. Applicants previously stated that no products and services that would be similar to the disclosed subject matter are known. That statement, too, remains accurate. However, the Examiner points to the first four patents as containing references to commercial products.

First, it should be noted that no commercial products of Hewlett-Packard are listed. Second, two commercial products are described, namely, E-Ink's electrophoretic displays and Xerox's gyricon spheres, as competing technologies with the visual display devices disclosed and claimed. Further information beyond what is provided in the patents is available at [www.eink.com](http://www.eink.com) and [www.gyricon.com](http://www.gyricon.com) (soon to be terminated by Xerox), respectively. These products employ technology for displays that is completely different from that disclosed and claimed in the instant application, and thus were not cited as identifying "products and services embodying the disclosed subject matter of three-dimensional molecular assembly and its applications for molecular display and moletronics".

Whether these technologies might be considered to be "similar" to Applicants' claimed invention is an area wherein reasonable people might differ. Electrophoretic ink includes one or more species of particles that either absorb or scatter light. Gyricon spheres comprise addressable, optically anisotropic balls (e.g, half white and half black). Neither technology employs rotating moieties (rotors) secured between stationary moieties (stators), and neither technology employs three-dimensional networks of such rotor-stator combinations.

Three of the references cited by the Examiner (U.S. Patents 6,556,470, 6,731,532, and 6,876,570) disclose a variety of electronic displays in their Description of Related Art sections. However, Applicants consider that such displays, which function on entirely different principles than the molecules claimed herein would afford, are not anywhere near as significant as the references Applicants cited in paragraphs 0001-0004 of the specifi-

cation (and updated herein). In this connection, Applicants note that they cited U.S. Patent 6,556,470; U.S. Patents 6,731,532 and 6,876,570 are divisionals of the '470 patent.

3. To enter in the record the art suggested by the Applicants as relevant to this examination.

Applicants submit herewith an Information Disclosure Statement and PTO-1449, listing the references of Item 1.

4. A list of key words that are particularly helpful in locating publications related to the disclosed art of three-dimensional molecular assembly and its applications for molecular display and moletronics.

Applicants have previously provided a list of keywords for searching.

5. A list of citations to electronically searchable databases or other indexed collections containing publications that document the knowledge within the disclosed art of three-dimensional molecular assembly and its applications for molecular display and moletronics.

Applicants have previously provided a list of electronically searchable databases.

6. Copies of each publication that any of the applicants authored or co-authored and which describe the disclosed art of three-dimensional molecular assembly and its applications for molecular display and moletronics.

Applicants previously stated that there are no such publications.

7. The title, citation, and copy of each publication that any of the applicants relied upon to develop the disclosed art of three-dimensional molecular assembly and its applications for molecular display and moletronics, with a concise explanation of the reliance placed on that publication in the development of the disclosed subject matter.

Applicants previously stated that they did not rely on any such publications. Their invention represents original work.

8. A statement as to whether any search of prior art was performed, and if so, the citation for each prior art collection searched, as well as whether any art retrieved from the search was considered material to demonstrating the knowledge of a person having ordinary skill in the art to the disclosed art of three-dimensional molecular assembly and its applications for molecular display and moletronics.

Applicants previously stated that at least one prior art search was done by one of the inventors, but no relevant art was turned up. This is considered to be a pioneering invention.

9. A statement as to the specific improvements of the subject matter in Claims 1-13 and 17-29 over the disclosed prior art and an indication of the specific elements in the claimed subject matter that provide those improvements.

Applicants previously stated that they were not aware of any prior art that the present invention is an improvement over, so no statement could be made as to the specific improvements. That statement remains correct.

Applicants had cited several related pending applications (many of which have now issued as patents) in paragraphs 0002-0004. Apparently, those citations were insufficient to be responsive to the Examiner's request for information. Accordingly, all of the references cited in those paragraphs, together with updated information for paragraph 0001, are included in item 1 above, as well as other patent references filed in the names of the inventors.

Applicants contend that reasonable people can differ with regard to what is considered pertinent to an invention. In Applicants' previous response, Applicants limited themselves to the plain language of the Examiner's request, namely, all references relating to the "claimed subject matter art of three-dimensional molecular assembly and its applications for molecular display and moletronics". Applicants endeavored to comply with that request. However, the Examiner considers references pertinent to Applicants' invention that do not, in Applicants' opinion, fall within the subject matter of three-dimensional

molecular assembly and its applications for molecular display and moletronics. Accordingly, Applicants have cited all patent references filed in the names of the inventors (based on patent disclosures submitted to HP's patent department) prior to the submission date of the patent disclosure upon which the present application is based, leaving it to the Examiner to consider what is pertinent and what is not pertinent. Applicants have not published any technical papers on this technology, nor are any commercial products offered for sale by HP based on this technology.

As an aid to the Examiner, prior work in this technology dealt with the switching behavior of individual molecules. The present invention is directed to a three-dimensional molecular assembly, comprising a plurality of switching moieties in stacked layers.

Applicants submit that the foregoing is fully responsive to the Examiner's request for information and that this Response is made with candor and good faith under 37 CFR 1.56.

The Examiner cites U.S. Patent 5,275,924 (Devonald) "that seems to disclose the basic technology despite differing terminology".

This reference is directed to amphiphilic compounds for sequential monolayer deposition, wherein the compounds have a polyimide backbone and hydrophobic groups pendant therefrom. The pendant groups may contain chromophore groups. The compounds can purportedly be used to form non-centrosymmetric bilayers and are purportedly useful for forming various non-linear optical elements.

However, there is absolutely no disclosure or suggestion in this reference that a three-dimensional molecular assembly, comprising a first monolayer of "seed" molecules, a second monolayer of "active" molecules, and a third monolayer of "spacer" molecules, with a plurality of alternating second monolayers and third monolayers, can be formed, where the "seed" molecules initiate self-assembled molecular growth, the "active" molecules comprise a plurality of rotor moieties and stator moieties, and the "spacer" molecules provide spacing between layers.

Specifically, there is no disclosure or suggestion that this assembly can be placed between electrodes and an electric field applied to cause rotation of the rotors.

In particular, Devonald et al teach the sequential assembly of a bilayer comprising monolayers of an amphiphilic material. The amphiphilic material includes amide groups used to align the monomer layers and pendant non-linear optic chromophores. In this case, acceptor-donor groups on the chromophores of one layer complex with amide groups on a second layer to force the desired self-alignment of the chromophores within the bi-layer structure. The teachings are directed toward structures for non-linear optics, e.g., filters.

Applicants' specification and claims, on the other hand, are directed to the sequential assembly of monolayers, wherein each monolayer is a chromophore having rotor-stator switching elements. These teachings are directed toward molecular electronics and color displays.

In comparing the two technologies, it is first important to note that monolayer assembly of amphiphilic materials is well known and is the subject of many patents pre-dating Devonald. For example, U.S. Patent 5,034,277 (1991) granted to Laschewsky et al teaches multi-layering of amphiphilic monolayers for non-linear optical applications. The important differences then are the specific chemistries that are assembled, as discussed above. The functional mechanism of the monolayers, chemistry and application are notably different.

The application is considered to be in condition for allowance. The Examiner is respectfully requested to take such action. If the Examiner has any questions, he is invited to contact the undersigned at the below-listed telephone number. HOWEVER, ALL WRITTEN COMMUNICATIONS SHOULD CONTINUE TO BE DIRECTED TO: IP ADMINISTRATION, LEGAL DEPARTMENT, M/S 35, HEWLETT-PACKARD COMPANY, P.O. BOX 272400, FORT COLLINS, CO 80527-2400.

Respectfully submitted,

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